EFFICACY OF MODIFIED TASK ORIENTED EXERCISES PERFORMED ON A SWISS BALL OVER CONVENTIONAL TASK ORIENTED EXERCISE ON IMPROVING BALANCE AMONG CHRONIC STROKE PATIENTS

DISSERTATION

Submitted for the partial fulfillment of the requirement for the degree of

MASTER OF PHYSIOTHERAPY

ADVANCED PHYSIOTHERAPY IN ELECTIVE

NEUROLOGY

by

DINESHKUMAR.S

Bearing **Registration No : 271420261**

Submitted to

THE TAMILNADU Dr. M.G.R. MEDICAL UNIVERSITY

CHENNAI – 600032

OCTOBER – 2016

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NUNGAMBAKKAM, CHENNAI – 600034

CERTIFICATE

This is to certify that the dissertation work entitled "**EFFICACY OF MODIFIED TASK ORIENTED EXERCISES PERFORMED ON A SWISS BALL OVER CONVENTIONAL TASK ORIENTED EXERCISES ON IMPROVING BALANCE AMONG CHRONIC STROKE PATIENTS**" Was done by bearing the **Registration no : 271420261**. This work has been done as a partial fulfilment for the degree of Master of Physiotherapy, done at Mohamed Sathak A.J College of Physiotherapy, Chennai, and submitted in the year of **OCTOBER 2016** to the Tamil Nadu Dr. M.G.R Medical University.

Prof. R. RADHAKRISHNAN, M.P.T., PGDHM

Seal & Signature of Principal

Place : Chennai

Date : ……

MOHAMED SATHAK A.J COLLEGE OF PHYSIOTHERAPY

NUNGAMBAKKAM, CHENNAI – 600034

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SIGNATURE OF GUIDE

PROF. S.PARVATHI,

MPT(Neuro), M.SC(PSY),MIAP.

Place : Chennai

Date : ……

MOHAMED SATHAK A.J COLLEGE OF PHYSIOTHERAPY

NUNGAMBAKKAM, CHENNAI – 600034

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INTERNAL EXAMINER **EXTERNAL EXAMINER**

Place: Chennai

Date :.....

DECLARATION BY THE CANDIDATE

I hereby present and declare my dissertation titled **"EFFICACY OF MODIFIED TASK ORIENTED EXERCISES PERFORMED ON A SWISS BALL OVER CONVENTIONAL TASK ORIENTED EXERCISES ON IMPROVING BALANCE AMONG CHRONIC STROKE PATIENTS"** is the outcome of original work undertaken and carried out by me bearing the **Registration No :271420261**, under the guidance of my Guide at **Mohamed Sathak A.J. College of Physiotherapy**, Nungambakkam, Chennai – 600034. I also declare that the material of this dissertation has not formed in any way the basis for the award of any other degree previously from the Tamil Nadu Dr. M.G.R. Medical University, Chennai.

SIGNATURE OF THE CANDIDATE

Place: Chennai

Date :.....

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ABSTRACT

Title: EFFICACY OF MODIFIED TASK ORIENTED EXERCISES PERFORMED ON A SWISS BALL OVER CONVENTIONAL TASK ORIENTED EXERCISE ON IMPROVING BALANCE AMONG CHRONIC STROKE PATIENTS

Background and objective: Studies had reported wide variation in the components of physiotherapy treatment provided to stroke patients among different setting .Therapist belief on motor development and prognosis of the condition can influence the selection of treatment techniques in the management of stroke patients .The primary aim of the study was to know the Efficacy of modified task oriented exercises performed on a swiss ball over conventional task oriented exercises on improving balance among chronic stroke patients.

Methods: Rehabilitation clinics across Chennai was chosen for this study in that total of 20 patients was taken .each group assigned 10 and 10 patients.Group 1:10 patients 60 minutes receiving task oriented exercise on swiss ball in sitting,kneeling,qudripod and standing

Group 2 :10 patients,60 minutes receiving task oriented exercise only in sitting,kneeling,qudripod and standing .Procedure was done with the supervision of chief therapist.

Results: Twenty patients were taken for the treatment. In that The inferential statistical results of Independent 't' test for the intergroup comparison of Berg Balance Scale score had shown the 't' value of 3.64 (p-value= 0.01) and intergroup comparison of River mead Mobility Index score had shown the 't' value of 3.57 (p-value=0.01) (Table 5).

Conclusion: From the study it can be concluded that the modified task oriented exercises performed on a swissball was more effective than conventional task oriented exercise performed.

INTRODUCTION

INTRODUCTION:

Stroke is the second commonest cause of death and fourth leading cause of disability worldwide (Strong 2007). Approximately 20 million people for every year will suffer from stroke and of these 5 million will not survive. A study shows that majority of stroke are ischemic in nature; 88% were ischemic, 9% were due to intra cerebral haemorrhage, and 3% were due to subarachnoid haemorrhage. Stroke is also a predisposing factor for falls, epilepsy & depression in developed countries and is a leading cause of functional impairments (Steinbach's 2000). Another study shows that annual incidence rate of stroke in India is about 145 per 100,000 population. Hypertension is the one of the major risk factors for the stroke. In Indian population stroke is relatively common in young population [Indian population 60years ≥ 7.5% compared to the west (e.g. British population ≥ 65 years)]. In India the annual incidence of stroke is about 145 per 100,000 per year during 2003-05 and 2005-06.

Paralysis and balance disorders caused by stroke have a significant portion among the chronic diseases causing physical incapacity and increasing the risk of fall. Decrease in muscle strength and proprioception, more load on non-paretic extremity and increase in postural oscillation are among the factors causing distortion of balance, in such patients. It is reported that upper extremity dysfunction may affect the balance significantly in stroke patients, as well as the relation between lower extremity weakness and balance disorder following stroke. Accordingly, some forces and moments occur during the movement of the upper extremity, depending on the weight and dynamics of that arm and such forces and moments may distort the balance, affecting standing still and sitting posture and ability to change position. Au-Yeung et al indicated that distorted upper extremity functions, disrupt body kinematics and affect locomotors functions. Fall is one of the most common complications in stroke patients, and balance disorder is the major risk factor predisposing to fall. Fifty to 70 % of these patients experience fall at hospital or at home. The fear of fall caused by balance disorder, or femur fractures after fall cause a decrease in physical activity.

Postural control and balance are required components for walking and mobility after stroke. Particularly, training for weight-bearing on the affected side is essential. Sensory stimulation and neuro-developmental treatment, ensuring weight-bearing on the affected side, are among the conventional treatments. Postural control is reported to be the best indicator of independence in walking and daily life activities, in stroke patients. Therefore, improvement of stable standing position in hemiplegic patients and betterment of postural control is a critical step in the rehabilitation process. Correction of standing balance was found to be much more important than strengthening lower extremity muscles in improvement of daily life activities and walking capacity in the studies conducted.

Sitting not only involves the ability to maintain the body in erect posture but also the ability to reach for the variety of objects located within and beyond's arm length. Inability in maintaining a proper sitting posture is one of the most common problems after stroke. Proper sitting balance is required for individuals who recovering from stroke because it is the skill that is critical for making the patient more independent for doing the activities of daily living (Dean et al 1998) and also sitting ability has been shown to be a useful prognostic indicator for outcomes after stroke (Loewen and Anderson 1990, Morgan 1994). The disability associated with poor sitting arises primarily because of muscle weakness, sensory deficits and also because of tendency to adapt behaviour to avoid threats to balance. A furthermore important cause of balance impairment in stroke is a deficit of the central integration of sensory inputs (visual, vestibular and somatosensory)

For maintaining a proper balance requires the integration of sensory system includes visual, vestibular, somatosensory and also requires the normal functioning of brain includes inner ear, normal innervations and control center in cerebellum. An experimental study demonstrated that task oriented exercises assisted with sensory manipulation is more effective in maintaining the postural stability for stroke patients.

Task oriented training is a effective method of treatment in any form of stroke survivors to improve the multi system functioning of central nervous system. Task oriented exercises have been used for quite long time by physiotherapists as an effective means of improving balance. It may reduce the causative impairment and helpful in retraining the effective task specific functional movements of the body. Few recent studies were also suggesting that Balance training in unstable surface may also improve the postural control mechanisms among neurologically impaired persons especially after stroke. There are several researches has been done on the stable surface balance training and task specific training in normal as well as hemiplegic subjects and the researchers were proven the effects of both oriented training is considered to be an effective interventions, it was performed on the stable platform surfaces. In the recent years Task oriented exercises like weight shifting exercises, trunk training exercises, sit to stand training, gait upper limb object reach deep flexion activity training, strength training, task oriented circuit training on stable and unstable surface used by various researchers to improve the balance and mobility functions in post stroke individuals. However, only very limited studies were used the swiss ball as an unstable surface balance training tool in stroke patients. In this present study we hypothesis that if the task oriented exercises performed on the unstable surfaces like Swiss ball it may reinforce the effectiveness of task specific exercises to make better clinical outcomes.

Swiss ball is a large inflated ball generally measuring from 45 to 85 cm in height. They were first used in the 1940s in England by the Bobaths to treat children with cerebral palsy. Exercise balls were introduced to Swiss physiotherapist to use them for treating athletes and train other physical therapists. A Swiss ball may be used as effective unstable surface balance training tool by performing task oriented exercises on it. So, this present study was conducted to study and compare the effectiveness of modified task oriented training performed on a Swiss ball compared with the conventional task oriented exercises performed on stable surface in stroke patients.

NEED FOR THE STUDY

2.1 NEED FOR THE STUDY

Based on the available literatures, there are evidences to show that task oriented exercises performed on swiss ball to improve balance showed beneficial effects on balance among stroke patients. There are also evidence to support that conventional task oriented exercises performed also improves balance in stroke patients, but there are very few studies that compared the efficacy of task oriented exercises performed on Swiss ball and conventional task oriented exercises. Hence the need of my study is to compare the effect Efficacy of modified task oriented exercises performed on a swiss ball over conventional task oriented exercises on improving balance among chronic stroke and to find out which two shows the most beneficial effect in improving balance among hemi paretic patients.

2.2 OBJECTIVE

To assess the comparative effect Efficacy of modified task oriented exercises performed on a swiss ball over conventional task oriented exercises on improving balance among chronic stroke

2.3 HYPOTHESIS

NULL HYPOTHESIS:

There will be no significant improvement in balance following balance training with modified task oriented exercises performed on a swiss ball over conventional task oriented exercises.

ALTERNATIVE HYPOTHESIS:

There will be significant improvement in balance following balance training with modified task oriented exercises performed on a swiss ball over conventional task oriented exercises.

2.4 OPERATIONAL DEFINITIONS:

Definition of task-related training

Unfortunately, no conclusive definition of a task-oriented approach exists in the literature. In the task-oriented approach, movement emerges as an interaction between many systems in the brain and is organized around a goal and constrained by the environment (Shumway Cook & Woollacott 2001).

2.5 PROJECTED OUTCOME:

Based on the available literature it is expected that there will be a significant difference in balance following training with modified task oriented exercises performed on a swiss ball over conventional task oriented exercises.

LITERATURE REVIEW

CHAPTER – II

REVIEW OF LITERATURE

Mudie MH et al (2002) Training symmetry of weight distribution after stroke: a randomized controlled pilot study comparing task-related reach, Bobath and feedback training approaches

Jean-francois Bayouk (2006) An experimental study which was conducted at Concordia University, Canada among 16 Hemi paretic patients were taken for evaluating the effect of task oriented exercises for balance with and without altered sensory input. The study concluded that task oriented exercise program assisted by sensory manipulation was feasible and more effective for the improvement of the standing balance of hemi paretic subjects.

Catherine M. Dean et al (1997) Sitting training early after stroke improves sitting ability and quality and carries over to standing up but not to walking: a randomised controlled trial.

Sukumar S, Jayasrikanth S (2008) The total 40 subjects selected using simple random sampling, (20 in each group) were completed the two months of intervention. The interventional group treated with modified task oriented exercises on a swiss ball and comparator group was treated with conventional task oriented exercises on stable surface for two months duration. In this present study it was found that there was a significant (p=.000) increase in Berg Balance Score score in subjects who performed task oriented exercises on a Swiss ball. As similar significant (p=.05) improvement was also found on subjects who performed task oriented exercises o a stable flat

surface. But when the improvements of two groups were compared those subjects who used Swiss ball had shown a significant (p=0.02) and better improvement in the BBS scores. In this present study it was also found that there was a significant increase in RMI score (p=.000) in subjects who performed task oriented exercises on a Swiss ball and stable flat surface.

Leroux A, Pinet H, Nadeau S (2006) Task-oriented intervention in chronic stroke: changes in clinical and laboratory measures of balance and mobility. Ten stroke subjects took part in an 8-wk exercise program aimed at improving balance and mobility through various functional tasks. Clinical measures included the Berg Balance Scale and the Timed-Up-and-Go and laboratory measures included ground reaction forces and center of pressure displacement during four functional tasks. Stroke subjects showed significant improvements ($P < 0.05$) in the clinical measures after completing the exercise program. Significant improvements ($P < 0.05$) were also found in postural steadiness during tandem stance and stool touch and in force production through the paretic lower limb during sit-to-stand.

Hyung-Seok Seo. Jung-Ho Lee . Young-Han Park(2014) Effects of a Task-specific Exercise Program on Balance, Mobility, and Muscle Strength in the Elderly.

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Thielman GT, Dean CM, Gentile AM. (2004) Rehabilitation of reaching after stroke: task-related training versus progressive resistive exercise.

Hsieh CL, Hsueh IP, Mao HF(2000) Validity and responsiveness of the river mead mobility index in stroke patients.

Norris BS , Medley A. (2011) The effect of balance confidence and context on functional reach ability in healthy older adults.

Jang SH , Kim YH, Cho SH, Lee JH, Park JW, Kwon YH(2014) Cortical reorganization induced by task-oriented training in chronic hemiplegic stroke patients.

Hariohm K, Prakash V(2014) Deep flexion activity training in a patient with stroke using task-oriented exercise.

Da Silva PB, Antunes FN, Graef P, et,al.(2015) Strength training associated with task-oriented training to enhance upper-limb motor function in elderly patients with mild impairment after stroke: a randomized controlled trial.

Carla Bambirra , Maria Cecília de Betsan Rodrigues , Christina Danielli Coelho de Morais Faria , Fátima Rodrigues de Paula(2015) Clinical evaluation of balance in hemi paretic adults: a systematic review.

Lisa Blum, Nicol Korner-Bitensky(2008) Usefulness of the Berg Balance Scale in Stroke Rehabilitation: A Systematic Review.

Lotte W, Ingrid Van De Port, Mathijs V, Gillian M, Gert K.(2009) Effects of Task-Oriented Circuit Class Training on Walking Competency after Stroke.

MATERIALS & METHODOLOGY

CHAPTER III

MATERIALS AND METHODOLOGY

4.1 MATERIALS:

1 Yardstick,

2 standard chairs (one with arm rests, one without),

Foot stool or step, Stopwatch or wristwatch, 15 ft walkway.

4.2 STUDY DESIGN:

Quasi Experimental Design – Pre test and Post test Design with Two Comparison Treatments.

4.3 POPULATION/PARTICIPANTS:

Stroke patients from out patients in the department of Neurology, A total of 20 hemi paresis participants were assigned into 2 groups

Group 1 -10 participants – 10 participants receiving task oriented exercise on swiss ball in sitting, kneeling, qudripod and standing

Group 2 -10 participants – 10 participants receiving only task oriented exercises in sitting, kneeling, quadripod and standing

4.4 CRITERIA FOR SAMPLE SELECTION

4.4.1 INCLUSION CRITERIA:

Diagnosis of first Ischemic stroke resulting hemiparesis.

Age group 45-65years.

Onset of stroke less than 3 month.

Patient with Motor assessment sitting score – 3

Patient able to sit for 1 minute unsupported on a stable surface.

Patients able to understand and follow simple verbal instructions Mini mental state examination score above 24

No visual problems which would interfere with reaching to pick up objects or reading.

Berg Balance Scale score of minimum 20

4.4.2 EXCLUSION CRITERIA:

Obese patients (BMI>30)

Other neurological deficits which affect balance like cerebellar disease, Parkinsonism & vestibular disease.

Musculoskeletal abnormality like fracture, chronic stage of Osteoarthritis and ligament injury in lower extremity.

4.5 SAMPLING:

Convenience Sampling.

4.6 TREATMENT DURATION:

Group 1:10 patients 60 minutes receiving task oriented exercise on swiss ball in sitting, kneeling, qudripod and standing

Group 2 :10 patients,60 minutes receiving task oriented exercise only in sitting, kneeling, qudripod and standing

4.7 STUDY DURATION:

6 Months.

4.8 INSTRUMENT& TOOL FOR DATA COLLECTION:

BERG BALANCE SCALE AND

RIVERMEAD MOBILITY INDEX

4.9 STUDY SETTING:

Rehabilitation centres across Chennai.

4.10 TECHNIQUE OF DATA COLLECTION:

Initial assessment will be taken on the first day of physiotherapy reference by using outcome measures. Intervention was given to each group separately for 2 weeks. Final assessment was taken on the 15^{th} day of physiotherapy treatment using same outcome measures. Comparison of pre test and post test values within the group and between the groups was done finally.

4.11 TECHNIQUE OF DATA ANALYSIS & INTERPRETATION:

Data collected from subjects were analyzed using paired‘t’ test to measure changes between pre test and post test values of outcome measures within the group. Independent ‘t’ test was used to measure changes between the groups.

Paired ‘t’ test

$$SD = \sqrt{\frac{\sum (d - \overline{d})^2}{n - 1}}$$

$$t = \frac{\overline{d}\sqrt{n}}{SD}$$

$\overline{d}$ = Calculated Mean Difference of pre test & post test values

SD = Standard Deviation

n = Number of samples

d = Difference b/w pre test & post test values

Independent‘t’ test

$$t = \frac{|\overline{x}_1 - \overline{x}_2|}{SD\sqrt{\frac{1}{n_1} + \frac{1}{n_2}}}$$

Where,

$$SD = \sqrt{\frac{(n_1 - 1)SD_1^2 + (n_2 - 1)SD_2^2}{n_1 + n_2 - 2}}$$

$\overline{X_1}$ = Mean difference in Group A

$\overline{X_2}$ = Mean difference in Group B

SD = Combined standard deviation of Group A and Group B

n_1 = Number of patients in Group A

n_2 = Number of patients in Group B

SD_1 = Standard Deviation of Group A

SD_2 = Standard Deviation of Group B

4.12 PROCEDURE

Rehabilitation clinics across Chennai was chosen for this study in that Group 1:10 patients 60 minutes receiving task oriented exercise on swiss ball in sitting, kneeling, qudripod and standing

Group 2 :10 patients,60 minutes receiving task oriented exercise only in sitting, kneeling ,qudripod and standing .Procedure was done with the supervision of chief therapist

DATA ANALAYSIS AND INTERPRETATION

CHAPTER – IV

DATA ANALAYSIS AND INTERPRETATION

Data analysis is the systemic organization and synthesis of research data and testing of research hypothesis using these data. Interpretation is the process of making sense of the results of a study and examining the implication (Pol it& Belt, 2004). The pre test and post test values for Groups 1 & 2 were obtained before and after intervention. The improvement in balance was assessed using Berg Balance Scale and River mead Mobility Index score. The mean, standard deviation and Paired "t" test values were used to find out whether there was any significant difference between pre test and post test values within the groups.

Independent "t" test is used to find the significant differences between the groups after intervention.

TABLE:1

PRE & POST TEST VALUES OF RIVER MEAD MOBILITY INDEX IN GROUPS 1 & 2.

NO	Pre test Group 1	Post test Group 1	Pre test Group 2	Post test Group 2
1	3	10	4	8
2	4	9	4	7
3	3	9	3	7
4	3	9	3	7
5	5	12	4	10
6	3	9	3	7
7	4	11	4	9
8	3	8	3	6
9	5	11	5	9
10	3	9	3	7

TABLE 2

MEAN DIFFERENCE, STANDARD DEVIATION AND PAIRED 'T' TEST VALUES OF RIVERMEAD MOBILITY INDEX

GROUPS (MAS)	n	MEAN	MEAN DIFFERENCE	STANDARD DEVIATION	t Value	P value
Group 1 Pre-test Post test	10	3.60 9.70	6.1	0.73	26.14	p<0.001
Group 2 Pre-test Post test	10	5.50 8	2.50	0.87	14.81	p<0.001

In table 2 the pre test and post test mean difference in Group 1 is 6.1 and Group 2 is 2.50.

The obtained‘t’ value for the Group 1 (n=10) is 26.14 and for the Group 2(n=10) is 14.81.

The corresponding ‘p’ value for the Group 1 and Group 2 is the same i.e., less than 0.001.

Therefore, the result shows that there is a significant difference between Group 1 and Group 2.

The result shows that pre test, post test mean difference of MAS of

Group 1 is statistically significant than Group 2.

DIAGRAM 1

PRE TEST AND POST TEST MEAN VALUES OF RIVERMEAD MOBILITY INDEX BETWEEN GROUP 1 AND GROUP 2

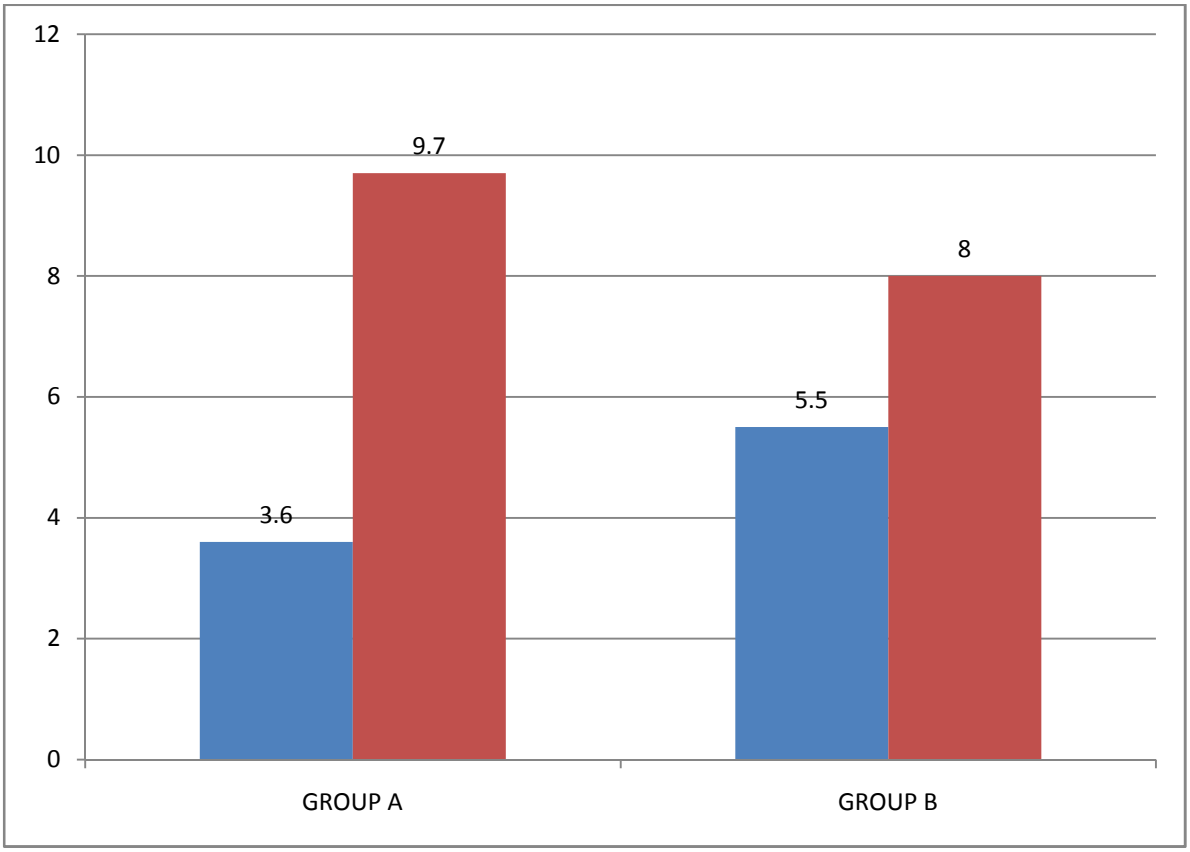

DIAGRAM 2

PRE TEST AND POST TEST MEAN DIFFERENCE OF RIVERMEAD MOBILITY INDEX BETWEEN GROUP 1 AND GROUP 2

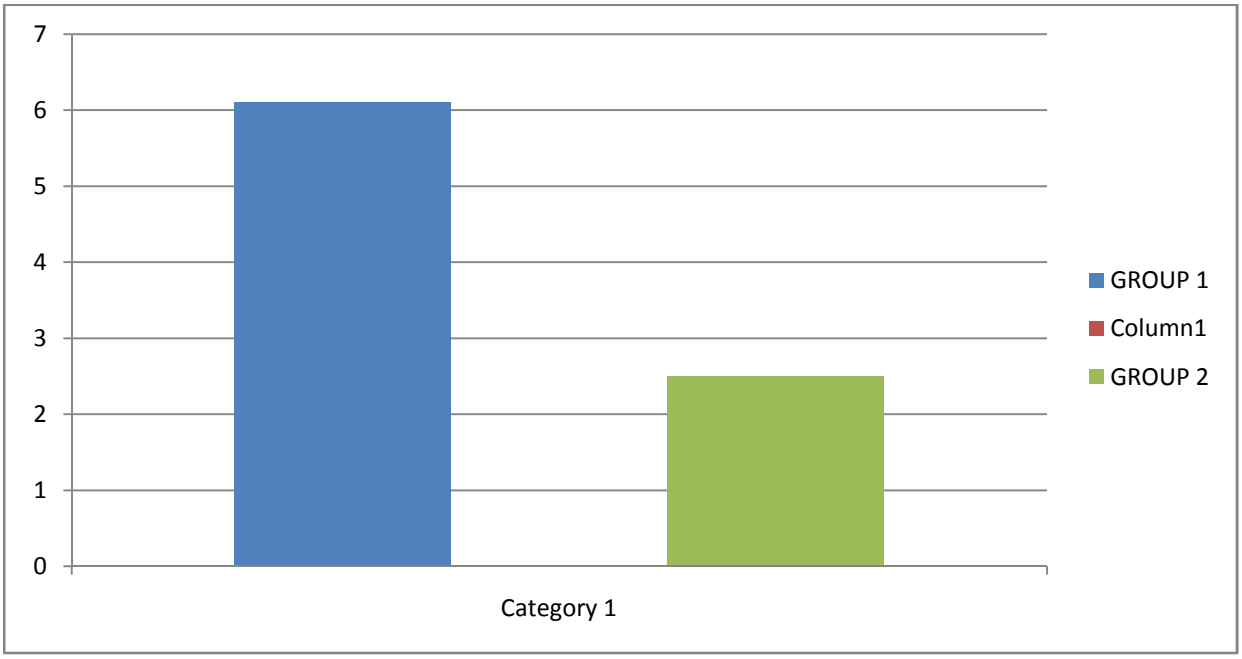

TABLE 3

PRE TEST & POST TEST VALUES OF BERG BALANCE SCALE IN GROUPS 1 & 2.

NO	Pre test Group 1	Post test Group 1	Pre test Group 2	Post test Group 2
1	22	45	24	40
2	25	47	21	39
3	23	43	26	38
4	24	46	32	41
5	30	51	25	45
6	24	46	28	41
7	27	49	22	43
8	23	44	29	41
9	31	51	32	49
10	28	48	27	44

TABLE 4

MEAN DIFFERENCE, STANDARD DEVIATION AND PAIRED 'T' TEST VALUES FOR BERG BALANCE SCALES

GROUPS (MAS)	n	MEAN	MEAN DIFFERENCE	STANDARD DEVIATION	t Value	P value
Group A Pre-test Post test	10	25.7 47	21.3	1.05	63.56	p<0.001
Group B Pre-test Post test	10	25.70 42.10	16.4	4.0	13.22	p<0.001

In table 4, the pre test and post test mean difference in Group 1 21.3and for the Group 2 is 16.4.

The obtained 't' value for the Group 1 is 63.56 and for the Group 2 is 13.22The corresponding 'P' value for the Group 1 and Group 2 is the same i.e., less than 0.001.

Therefore, the results show that there is a significant difference between Group 1 and Group 2.

The result shows that pre test post test mean difference of Berg balance scale of Group 1 is statistically significant than Group 2.

DIAGRAM 3

PRE TEST AND POST TEST MEAN VALUES OF BERG BALANCE SCALE BETWEEN GROUP 1 AND GROUP 2

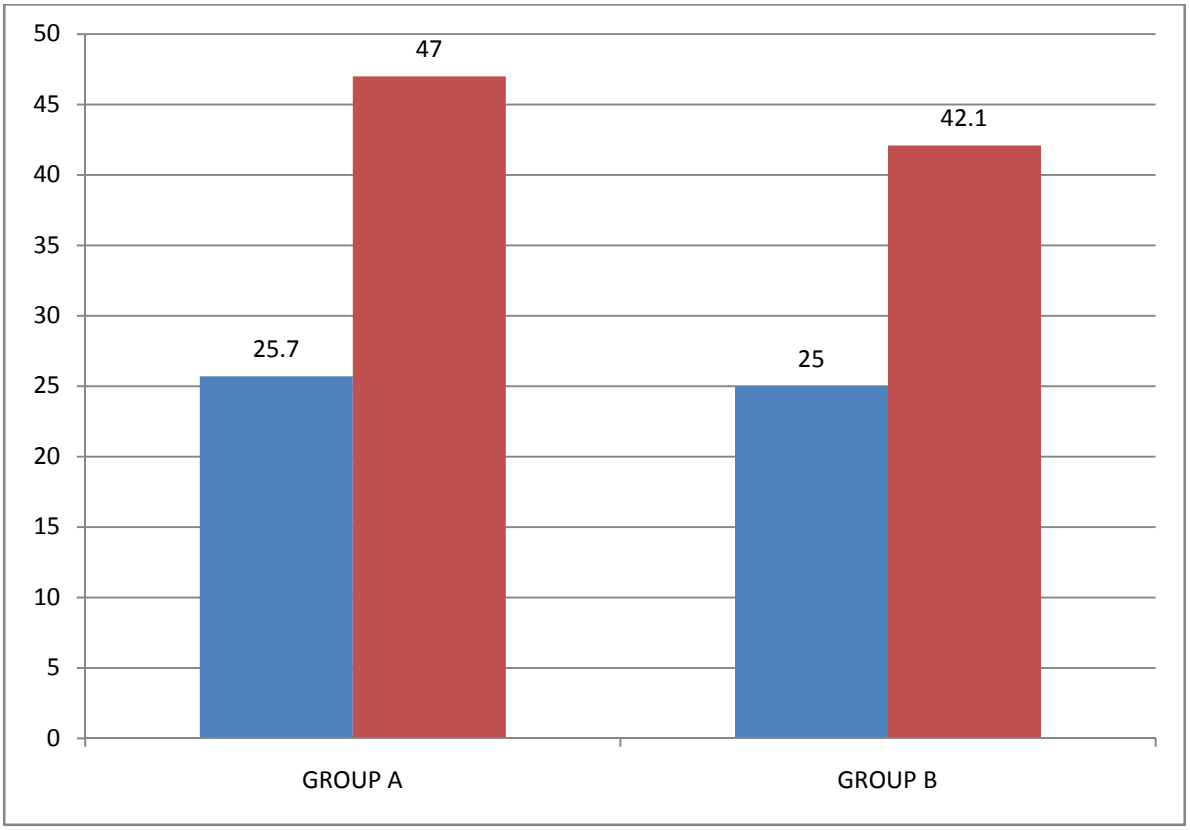

DIAGRAM 4

PRE TEST AND POST TEST MEAN DIFFERENCE OF BERG BALANCE SCALE SCALE BETWEEN GROUP 1 AND GROUP 2

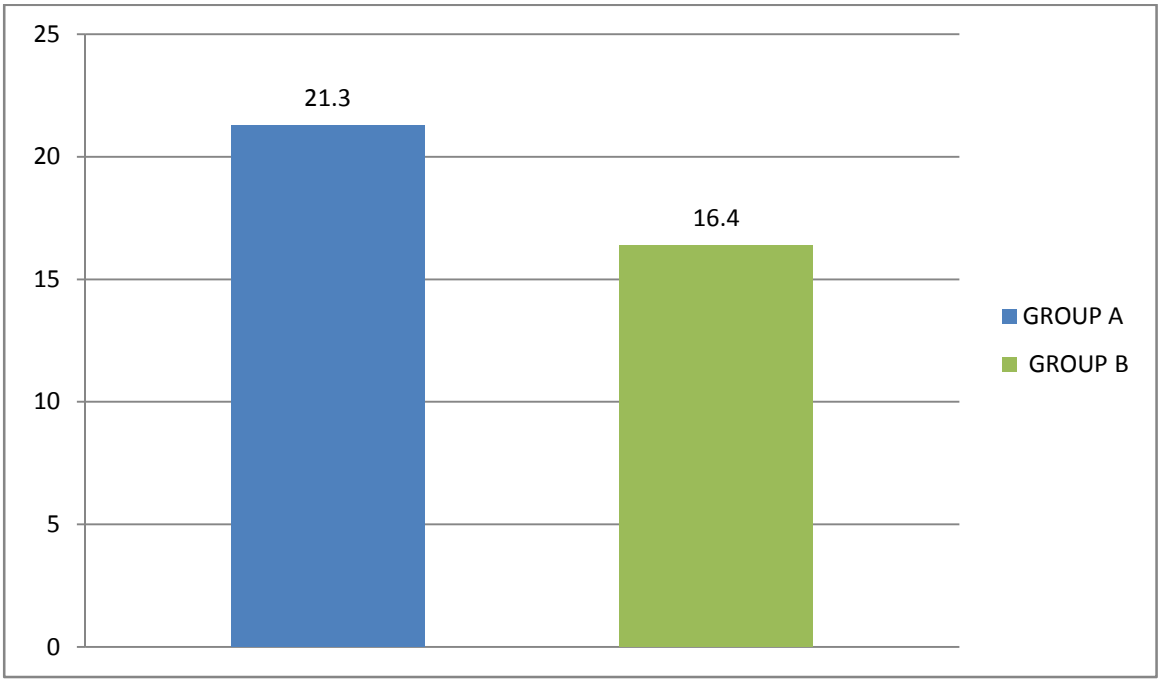

TABLE 5

INDEPENDENT‘t’ TEST VALUES

Outcome measures	Mean Difference	Standard Deviation	t value	P value
River mead Mobility Index	4	1.24	3.57	p<0.01
Berg Balance Scale	4.9	2.78	3.64	p<0.01

The mean difference between Group 1and Group 2 for River mead Mobility Index is 4 & for Berg Balance Scale is 4.9.

The obtained Independent ‘t’ value for River mead Mobility Index is 3.57, for Berg Balance Scale is 3.64.

The corresponding ‘P’ value for River mead Mobility Index and Berg Balance Scale between both groups is the same i.e., less than 0.01.

Therefore, the result shows that there is a statistical significance difference for River mead Mobility Index and Berg Balance Scale between two groups

RESULTS AND DISCUSSION

CHAPTER V

RESULTS

The results of Paired ‘t’ test for The River mead Mobility Index score have shown the mean difference of 6.1 (Pre Mean-3.6 and Post Mean 9.7) in group 1 and 2.50 (Pre Mean 5.5 and Post Mean 8) in group 2 (Table 2). And also, The statistical results of paired t test for berg balance scale score have shown the mean difference of 21.3 (Pre Mean 25.7, Post Mean 47) in the group 1 and 16.4 (Pre Mean 25.7, Post Mean42.1) in group 2 (Table 4).

The inferential statistical results of Independent ‘t’ test for the intergroup comparison of Berg Balance Scale score had shown the ‘t’ value of 3.64 (p-value= 0.01) and intergroup comparison of River mead Mobility Index score had shown the ‘t’ value of 3.57 (p-value=0.01) (Table 5).

DISCUSSION

The purpose of this study was to assess the efficacy of modified task oriented exercises performed on a Swiss ball over conventional task oriented exercises on improving balance and mobility function post stroke. Various combination of Task oriented training on stable and unstable surfaces were effectively used to treat balance, mobility and hand function issues there are very few studies available by using a swiss ball as an unstable surface tool for non task oriented trunk control in stroke patients. As there is no study available on task oriented balance training by using swiss ball, this study aimed at comparing it with conventional task oriented exercises on stable surface. The results of this study showed that there was a significant increase in BBS score (p=0.001) in subjects with group 1 as well as in group 2 (p=.001). When comparing the improvement of balance between two groups it was found that the subjects used Swiss ball had shown a significant improvement in the BBS scores (p=0.001). The above finding may be explained by the fact that subjects those who performed task oriented exercises on a Swiss ball were subjected to high proprioceptive activation in trunk and lower limb components than the comparator group who performed task oriented exercises on stable flat surface. The statistical evidences of this study also correlated with the findings of previous study done by Akshatha Nayak et.al, on balance for non task oriented trunk control exercises on a swiss ball in stroke patients.

Within groups comparison of Rivermead mobility index score between the pre and post intervention mobility function demonstrated that there was a significant increase in RMI score with t value of 26.14 (p=.001) in subjects who performed task oriented exercises on a Swiss ball and 't' value of 14.81 (p=.001) for the subjects performed exercises on stable surface. When the mean difference of post interventional Rivermead mobility index score were compared, there was no significant (p=.001) difference in the RMI scores between two groups. This evidence also suggesting that task oriented training on a swiss ball was shown a comparable improvement in the context of mobility function.

LIMITATIONS OF THE STUDY:

Exercises on Swiss ball required greater supervision and precaution

Patient required a longer time to get accustomed to the Swiss ball

There is only limited literature on the use of Swiss ball in post stroke rehabilitation.

CONCLUSION

CHAPTER VI

CONCLUSION

This study was conducted to investigate the Efficacy of modified Task Oriented Exercise Performed On A Swiss Ball Over Conventional Task Oriented Exercise On Improving Balance Among Chronic Stroke Patients. Thus the statistical analysis of data concluded that

"There was statistically significant improvement in Balance following Modified Task Oriented exercises on Swiss ball than conventional Task Oriented Exercise among hemiparetic patients".

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ANNEXURES

ANNEXURE I

INFORMED CONSENT FORM

I Mr /Mrs_____Age_____here by volunteer myself to take part in the study agreed to participate in the study_____ Efficacy of modified Task Oriented Exercise Performed On A Swiss Ball Over Conventional Task Oriented Exercise On Improving Balance Among Chronic Stroke Patients done by **Dineshkumar.s** MPT final year student in **Mohamed sathak AJ college of physiotherapy**, Chennai.

He has explained me about all the procedures to be performed and I gave my consent to participate in the study.

Place :

Date :

Participant signature : _____

Signature of witness : _____

Investigator's signature : _____

ANNEXURE II

NEUROLOGICAL ASSESSMENT FORM FOR STROKE

Medical Diagnosis:

Referred By:

Assessed by:

SUBJECTIVE EXAMINATION

DEMOGRAPHIC DATA

Name:

Age: Sex: Date:

Address:

Growth and Development:

Chief Complaints:

History of present illness:

Past history of current condition:

Past medical and surgical History:

RISK FACTORS

Personal History:

Family History:

Occupational History:

History of living environment:

Social History:

Previous functional status:

Pain History

Side :

Site :

Onset :

Duration :

Type :

Aggravating factors :

Relieving factors :

Severity :

Vital Signs

Temperature :

Blood pressure :

Heart rate :

Respiratory rate :

OBJECTIVE EXAMINATION

ON OBSERVATION

Built :

Posture :

Attitude of limbs :

Muscle wasting :

Pattern of movement :

Gait :

Pressure sore :

Edema :

Tropical changes :

External appliances :

On Palpation

Tone :

Edema :

Tenderness :

Warmth :

1. HIGHER MENTAL FUNCTIONS

Level of consciousness

Orientation

Person :

Place :

Time :

Memory

Immediate :

Recent :

Remote :

Attention :

Communication :

Emotional status :

2. HIGHER CORTICAL FUNCTIONS

Cognition:

Fund of knowledge

Calculation

Proverb interpretation

Perception:

Body scheme/ body image disorders

Spatial relation disorders

Agnosias

Apraxia

3. CRANIAL NERVES

4. SENSORY SYSTEM

5. MOTOR SYSTEM

Muscle Tone:

Upper limb	Lower limb

Muscle Power:

Voluntary motor control:

	Right	Left
Upper limb		
Lower limb		

AREA	Rt(cms)	Lt(cms)
Arm		
Forearm		
Thigh		
Calf		

Muscle girth:

Movement time:

Associated Reactions:

6. Reflexes

Superficial:

Abdominal

Plantar

Deep:

JERKS	Rt	Lt
Biceps		
Brachio – radialis		
Triceps		
Knee		
Ankle		

Tonic Postural Reflexes:

7. INVOLUNTARY MOVEMENTS:

8. CO-ORDINATION

Non equilibrium test:

Equilibrium test :

9. BALANCE

Balance	Static	Dynamic
Sitting		
Standing		

Centre of Gravity Control:

Balance Reactions:

Motor Strategies:

Sensory Strategies:

10. GAIT

Bio mechanical deviations

11. HAND FUNCTIONS

Reaching

Grasping

Releasing

12. ASSISTIVE DEVICES

13. OTHER SYSTEMS

Integumentary system

Pressure sore

Respiratory system

Secretion

Pattern of breathing

Deformity

Cardiovascular system

Deep vein thrombosis

Edema

Musculoskeletal system

Contracture

Subluxation

Stiffness

Heterotopic ossification

Osteoporosis

Bladder and bowel function

Gastro intestinal system

Sexual function

Autonomic system

Vasomotor

Pseudomotor

Tropic changes

Postural hypotension

Reflex sympathetic dystrophy

14. FUNCTIONAL STATUS

Bed mobility:

Transfer:

PHYSICAL THERAPY DIAGNOSIS

Direct impairments

Indirect impairments

Composite impairments

Functional limitations

PHYSICAL THERAPY MANAGEMENT:

ANNEXURE – III

PROFORMA

Name:

Age: sex:

Diagnosis:

Date of Assessment:

Group:

Scores:

Berg Balance Scale → total score - 56

Test	Group 1	Group 2	Total
Pre test			
Post test			

River Mead Mobility Index → total score – 15

Test	Group 1	Group 2	Total
Pre test			
Post test			

Berg Balance Scale

Name: _____ Date: _____

Location: _____

ITEM DESCRIPTION	SCORE (0-4)
Sitting to standing	_____
Standing unsupported	_____
Sitting unsupported	_____
Standing to sitting	_____
Transfers	_____
Standing with eyes closed	_____
Standing with feet together	_____
Reaching forward with outstretched arm	_____
Retrieving object from floor	_____
Turning to look behind	_____
Turning 360 degrees	_____
Placing alternate foot on stool	_____
Standing with one foot in front	_____
Standing on one foot	_____

Total _____

River Mead Mobility Index

River mead Mobility Index No	Parameter	scores y-1, n-0
1	Turning over in bed	
2	Lying to sitting	
3	Sitting balance	
4	Sitting to standing	
5	Standing unsupported	
6	Transfer	
7	Walking inside with an aid if needed	
8	Stairs	
9	Walking outside (even ground)	
10	Walking inside with no aid	
11	Picking off floor	
12	Walking outside (uneven ground)	
13	Bathing	
14	Up and down 4 steps	
15	Running	